

## A NOTE ON LICHENS IN THE VICINITY OF MASHHAD (RAZAVI KHORASAN, NE IRAN)

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Received 01.02.2011. Accepted for publication 02.03.2011.

Haji Moniri, M., Jandaghi, M. & Masroornia, M. 2011 06 30: A note on lichens in the vicinity of Mashhad (Razavi Khorasan, NE Iran). *J. Bot.* 17 (1): 133-136. Tehran.

As a first step towards a lichenological survey around Mashhad, the center of Razavi Khorasan province with rapid urbanization, 11 lichen species are reported. This includes *Candelariella viae-lacteeae* reported as new to Asia and five further species, which are new to the province.

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**Keywords.** Biodiversity, Lichenized fungi, *Candelariella viae-lacteeae*, new record, Iran

یادداشتی بر گلسنگ‌های حومه مشهد (خراسان رضوی، شمال شرق ایران)

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در اولین قدم به سوی سنجش گلسنگ‌های اطراف مشهد، مرکز استان خراسان رضوی منطقه‌ای با گسترش سریع شهرسازی، ۱۱ گونه گلسنگ گزارش می‌شود. این مجموعه شامل *Candelariella viae-lacteeae* به عنوان گونه جدیدی از آسیا به همراه پنج گزارش جدید برای استان می‌باشد.

### INTRODUCTION

The history of lichenological records in the northeast of Iran goes back to Szatala (1940, 1957). He reported lichens from several localities in the highlands, from Akhlamad waterfall to Budjnurd and presented identification keys. Most of these localities are situated in the current Razavi Khorasan. This occupies an area of 127,432 km<sup>2</sup>, and belongs biogeographically to the Irano-Turanian region (Thakhtajan, 1986). Since 2004, lichenological investigations are being carried out here by Iranian scientists, in collaboration with partners from abroad (Seaward *et al.* 2004, 2008; Haji Moniri & Sipman 2009; Moniri *et al.* 2009; 2009; Haji Moniri & Kukwa 2009; Haji Moniri *et al.* 2010). As a result our current knowledge of the regional lichen biodiversity is considerably improved also as to crustose taxa, but the high percentage of new records in this paper is an instance to underline the incompleteness of the present knowledge. Consideration of the investigated localities

in the above references elucidates that there are very many unexplored areas in the region. As an approach to understanding the role of lichenized fungi in the richness of biodiversity in the province, we conducted a taxonomic experiment on the sites near the city of Mashhad and Kalat, from which very little is known as regards lichens. Thus far only four species *Lecanora usbeckica* Poelt, *Toninia candida* (Weber) Th. Fr., *T. sedifolia* (Scop.) Zahlbr., and *Xanthoria elegans* (Link) Th. Fr., were known from this area (Seaward *et al.* 2004).

### MATERIAL AND METHODS

The results presented here are based on material collected from four localities, three in the countryside around Mashhad and one near Kalat. Morphology was studied using a stereomicroscope. For anatomical observations, fragments of lichens were sectioned with a razor blade and studied by a Nikon light microscope,

photos being made with a digital Dino-lite camera. Chemical analyses were carried out by standard reagents according to the methods of Orange *et al.* (2001). The quotations of localities follow those given in the herbarium labels. The studied material is deposited in the private collection of the first author.

## RESULTS AND DISCUSSION

So far, the identification revealed the presence of 11 species, alphabetically listed below. From Kardeh one species is reported, from Taraghdar five species, from Kalat two species and from Noghondar three species.

One species, *Candelariella viae-lacteeae*, marked in bold with \*, is of particular interest. The genus *Candelariella* according to Sohrabi *et al.* (2010) is represented in Iran by four species, all with a yellow thallus. Among the investigated material, we discovered a species with grey thallus, which turned out to be *C. viae-lacteeae*. Details about this species are presented by Thor & Wirth (1990) and show that the species is new not only to Iran but also to the whole of Asia, being previously reported only from Europe (Greece and Hungary).

Five further species, marked in bold, are new to the province of Razavi Khorasan: *Candelariella antennaria*, *Diploschistes scruposus*, *Lecania cyrtella*, *Lecanora argopholis* and *Xanthomendoza fallax*. They were reported before in Iran from Azerbaijan, Tehran, Kordestan and Mazandaran.

The surroundings of Mashhad have a dry climate. Five annual climatic statistics have demonstrated that the average of the highest and lowest humidity is 38% and 10%, respectively (Anonymous, 2010). This low humidity in the region is disadvantageous for the establishment of spores and propagules and thus preventive for a rapid replenishment of the lichen diversity across the landscapes in case of habitat destruction connected with the exploding urbanization. According to the plan of development and improvement for the (comprehensive) Mashhad area, the surface of the city is estimated to increase from 5300 to 11000 km<sup>2</sup> over a period of 15 years, from 2005 to 2020 (Farnahad, 2005). This excessive expansion of Mashhad and the presence of only two reserved parts in the area lead to corresponding losses of natural habitats and in view of the environmental sensitivity of the most lichen species, an extensive study plan for the lichen flora of the whole surroundings of the city is urgently needed. Now, in 2010, the majority of the lichen habitats of two sampling sites, Taraghdar and Noghondar are disappearing due to extensive recreation, unfavorable to nature conservation and research. The presence of

the rare lichen *Candelariella viae-lacteeae* G. Thor & V. Wirth in the mountainous site in Taraghdar shows that precious nature treasures are becoming at risk.

## List of Lichen records

For each species locality, substrate (phorophyte), voucher data and reference are presented.

*Candelariella antennaria* Räsänen, Kardeh, 40 km north of Mashhad, 36°39'56"N, 59°39'53"E, alt. 1500 m, *Juglans regia* L., 6. Jul. 2010, M. Jandaghi 2448 ± Nash *et al.* (2004) (Fig. 1).

\**Candelariella viae-lacteeae* G. Thor & V. Wirth, Taraghdar, 15 km west of Mashhad, 36°97'57"N, 59°23'67"E, alt. 1300 m, *Fraxinus excelsior* L., 12. Oct. 2010, M. Jandaghi 2451± Thor & Wirth (1990) (Fig. 2).

*Diploschistes scruposus* (Schreb.) Norman, Taraghdar, 15 km west of Mashhad, 36°94'50"N, 59°21'12"E, alt. 900 m, calcareous rock, 17. Sept. 2009, M. Haji Moniri 2440± Wasser & Nevo (2005) (Fig. 3).

*Diplotomma alboatrum* (Hoffm.) Flot., Kalat, 150 km north of Mashhad, 37°32'N, 59°35'66"E, alt. 1250 m, calcareous rock, 12. Jul. 2010, B. Peiravi 2452. ± Purvis *et al.* (1992).

*Lecania cyrtella* (Ach.) Th. Fr., Noghondar, 25 km northwest of Mashhad, 36°64'23"N, 59°64'67"E, alt. 1300 m, *Fraxinus excelsior* L., 15. Oct. 2010, M. Jandaghi 2450± Smith *et al.* (2009) (Fig. 4).

*Lecanora allophana* (Ach.) Nyl., Noghondar, 25 km northwest of Mashhad, 36°64'15"N, 59°64'43"E, alt. 750 m, *Fraxinus excelsior* L., 17. Sept. 2009, M. Haji Moniri 2439. ± 7 KRP VRQ

*Lecanora argopholis* (Ach.) Ach., Noghondar, 25 km northwest of Mashhad, 36°94'50"N, 59°21'12"E, alt. 750 m, *Fraxinus excelsior* L., 17. Sept. 2009, M. Haji Moniri 2438± Thomson (1997) (Fig. 5).

*Lecidea atrobrunea* (Ramond in Lam. & DC.) Schaer., Taraghdar, 25 km west of Mashhad, 36°94'50"N, 59°21'12"E, alt. 900 m, rock, 17. Sept. 2009, M. Haji Moniri 2437. ± Thomson (1997).

*Physcia aipolia* (Ehrh. ex Humb.) Fürnr., Taraghdar, 25 km west of Mashhad, 36°94'50"N, 59°12'21"E, alt. 900 m, *Fraxinus excelsior* L., 17. Sept. 2009, M. Haji Moniri 2441. ± Wasser & Nevo (2005).

*Toninia aromatica* (Turner) A. Massal., Kalat, 150 km north of Mashhad, 37°32'N, 59°35'66"E, alt. 1250 m, soil, 12. Jul. 2010, B. Peiravi 2453. ± Nash *et al.* (2002).

*Xanthomendoza fallax* (Hepp) Söchting, Kärnefelt & S. Y. Kondr., Taraghdar, 25 km west of Mashhad, 36°64'23"N, 59°64'67"E, alt. 1300 m, *Fraxinus excelsior* L., 12. Oct. 2010, M. Jandaghi 2449± Smith *et al.* (2009) (Fig. 6).

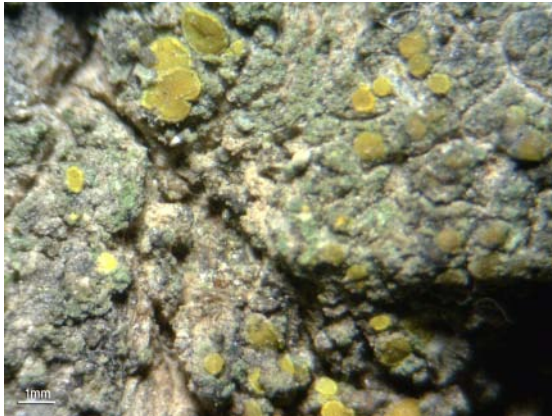


Fig. 1. *Candelariella antennaria*.



Fig. 2. *Candelariella viae-lacteeae*.



Fig. 3. *Diploschistes scruposus*.



Fig. 4. *Lecania cyrtella*.



Fig. 4. *Lecanora argopholis*.



Fig. 6. *Xanthomendoza fallax*.

Figs. 1-6. Some lichen species of Mashhad area.

**ACKNOWLEDGMENT**

Dr. Harrie Sipman is thanked for providing reference and Behnam Peiravi for field assistance.

**REFERENCES**

- Anonymous, 2010: Meteorological organization Khorasan Razavi URL: <http://www.razavimet.gov.ir>
- Farnahad consultative engineers. 2005: The plan of development and improvement (comprehensive) Mashhad area. vol 7. -Ministry of Housing and Urban Development, 229 pp. URL: <http://www.khorasanmaskan.ir>
- Haji Moniri, M. & Sipman, H. J. M. 2009: Lichens from two nature reserves in NE Iran. -Willdenowia 39: 199-202.
- Haji Moniri, M., Kukwa, M. 2009: Additions to the lichen biota of Iran. -Mycotaxon 110: 155-161.
- Moniri, M. H., Kamyabi, S. & Claydn, S. R. 2010: A preliminary study of Rhizocarpon macrosporum in Razavi Khorasan Province (NE Iran). -The Iranian Journal of Botany 16 (1): 185-189.
- Moniri, M. H., Kamyabi, S. & Fryday, A. M. 2009: Rhizocarpon saurinum new to Asia, and other reports of Rhizocarpon species from Razavi Khorasan Province, Iran. -Mycologica Balcanica 6: 89-92.
- Nash, T. H., Ryan, B. D., Gries, C. & Bungartz, F., 2002: Lichen flora of the Greater Sonoran Desert Region. vol I. Lichens, Tempe, 532 pp.
- Nash, T. H., Ryan, B. D., Gries, C & Bungartz, F., 2004: Lichen flora of the Greater Sonoran Desert Region. Vol II. Lichens Unlimited, Tempe, 742 pp.
- Orange, A., James, P. W. & White, F. J. 2001: Microchemical methods for the identification of lichens. -British Lichen Society, London, 101 pp.
- Purvis, W. O., Coppins, B. J., Hawksworth, D. L., James, P. W., & Moore, D. M. 1992: The Lichen Flora of Great Britain and Ireland. -The British Lichen Society, 710 pp.
- Seaward, M. R. D., Sipman, H., Schultz, M., Maassoumi, A., Haji Moniri, M. & Sohrabi, M. 2004: A preliminary lichen checklist for Iran. - *ICHQZID* ±
- Seaward, M. R. D., Sipman, H. J. M. & Sohrabi, M. 2008: A revised checklist of lichenized, lichenicolous and allied fungi for Iran. -Sauteria 15: ±
- Smith, C. W., Aptroot, A., Coppins, B. J., Fletcher, A., Gilbert, O. L., James, P. W. & Wolseley, P. A. 2009: The Lichens of Great Britain and Ireland. -The British Lichen Society 1006 pp.
- Sohrabi, M., Seaward, M. R. D., Ahti, T., Sipman, H. J. M. & Schultz, M. 2010: An updated checklist for lichenized, lichenicolous and allied fungi of Iran. URL: <http://www.myco-lich:online> mycology & lichenology of Iran.
- Szatala, S. 1940: Lichenes in K. H. Rechinger, J. Baumgartner, F. Petrak & S. Szatala, Ergebnisse einer botanischen Reise nach dem Iran, 1937. -Annales des Naturhistorischen Museums in Wien 50: 521-533.
- Szatala, S. 1957: Prodrum einer Flechtenflora des Irans. -Annales Historico-Naturalis Musei Nationalis Hungarici, series nova 8: 101-154.
- Thomson, J. W. 1997: American Arctic Lichens, 2. The microlichens. -The university of Wisconsin press, Madison 675 pp.
- Thor, G., Wirth, V. 1990: Candelariella viae-lacteeae, a new lichen species from Europe. -Stuttgarter Beiträge zur Naturkunde, serie A (Biologie) 445: 1-4.
- Thakhtajan, A. 1986: Floristic Regions of the World. -University of California press, California.
- Wasser, S. P., Nevo, E. 2005: Lichen-forming, *OFKHQFRXV DQG DOLGIXQLRI*, *VIDO* ± \$ 5 \$ Gantner Verlag K.- G., Ruggell. 385 pp.